

Rapid Assessment Protocol and Trial Use: Aspen/Cottonwood Browse

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I. Rapid Assessment Protocol: Aspen/Cottonwood Browse

Purpose

This protocol allows for rapid assessment of the most biologically-important aspect of ungulate browsing of aspen and cottonwood, namely the browsing of leaders. If a young aspen ramet or cottonwood sapling is to be recruited into an overstory tree, it must reach beyond ungulate browse height.

Brief Summary of the Protocol

Using a 6-foot range pole marked clearly in 1-foot intervals, determine the foot interval in which the tallest leader, i.e., the topmost primary shoot(s) of the stem resides. As previously-browsed aspen or cottonwood ramets/saplings frequently develop multiple "leaders", count all upward-trending "leaders" that fall within the foot-interval of the tallest leader, and for each leader, determine whether each is browsed or unbrowsed.

Method

1. Determine the area to be sampled, e.g., within 100' of a stream; or the length of an aspen stand; or the "skirt" of younger aspen at the edge of an aspen stand.
2. Determine which stems will be counted, e.g., those that intercept vertically above and below a measuring tape; or within a 6' belt transect.
3. For each stem counted, determine the foot interval (e.g., between 2.1-3') in which the tallest leader, (i.e., the topmost, upward-trending shoot of the stem) resides.
4. Count all upward-trending "leaders" that fall within the foot-interval of the tallest leader, and for each leader, determine whether each is browsed or unbrowsed (see sample data sheet)
5. Optional additional measurements, depending on the purpose for which the data are being gathered
 - a. Distinguish between leaders that unbrowsed/healthy leaders and unbrowsed/dead (e.g., from frost).
 - b. Count all aspen/cottonwood encountered that are taller than 6'

Note that while this method is objective and quantified, it avoids the need to measure precise heights. This protocol relies instead on higher numbers of plants being measured within precise ranges of height (e.g., 2.1'-3')

Quantitative Analysis

Depending on the purpose of the rapid assessment, any or all of the following quantitative analyses are easily generated if data are entered into an Excel table.

1. Percent of total leaders browsed¹
2. Percent of leaders browsed within each foot-interval
(1) and/or (2) provide information on the degree to which the stand or gallery is experiencing recruitment or suppression of recruitment into overstory trees.
3. Average number of leaders counted per plant
4. Average number of leaders counted within each foot-interval
(3) and/or (4) provide information on the degree to which aspen ramets or cottonwood saplings are being transformed into “bushes” with multiple leaders.
5. Density of ramets/saplings/trees less than and over 6 feet tall
6. Ratio of ramets/saplings above and below 6 feet in height.
(5) and/or (6) provide information on the structure of the stand or gallery in terms of plants whose leaders are still susceptible to or above ungulate browsing.

Rapid assessments of aspen or cottonwood leader browse can be repeated during a season for additional information. For instance, an approximation of the proportion of browsing due to wild and domestic ungulates can be gained by assessing an aspen or cottonwood stand or transect immediately prior to and immediately after livestock are grazed in an area. While this is not definitive, livestock do tend to displace elk and deer.² Further information can be gained from noting wild ungulate, cattle, and/or domestic sheep scat within the area or undertaking a quantitative pellet count.

Similarly, a transect run in multiple years allows for tracking of the rate at which a given stand is achieving recruitment of ramets/saplings into overstory trees.

Advantages of the Protocol

- Rapid
- Simple; a quarter-hour of training suffices
- Quantified
- Can be done by one person
- Easily repeated
- Provides information on a key biological factor: Recruitment or lack of recruitment of young aspen and cottonwood into overstory, in relation to ungulate browsing

¹ Note that this refers to leaders within the foot-interval of the tallest leader

² E.g., see Stewart, K.M., Bowyer, R.T., Kie, J.G., Cimon, N.J., & Johnson, B.K. (2002). Temporospatial distributions of elk, mule deer, and cattle: Resource partitioning and competitive displacement. *Journal of Mammalogy*, 83(1): 229-244.

II. Trial Rapid Assessment of Aspen Browse

Location

Tasha Creek
 Fremont River Ranger District
 Fishlake National Forest
 Quad: Mount Terrill; Township 25 S, Section 14
 UTM: CONUS NAD 27; Zone 12; 4472060E; 4276060N.
 North of Tasha Creek trail, at southern edge of mixed aspen/conifer stand

Methods

On September 6, 2007, a one-person, one-hour trial was run using this protocol in an aspen stand. However, as no transect tape was present, the trial was run by walking in one direction, counting all aspen intercepted in that direction. The direction was changed once, randomly, when a dense stand of conifers was encountered. Trees over 6' were not counted

Thus, this trial lacked:

- Distance of the transect (needed for density analysis)
- A precise transect line (for greater precision re: aspen ramets encountered)
- Count of trees over 6' (needed for partial structural analysis: proportion of ramets above and accessible to ungulate browsing)

Otherwise, the trial was similar to a standard use of the protocol. In one hour:

- 109 aspen ramets were encountered. (With more practice and with two people, the assessment would be even more rapid.)
- 179 leaders fell within the same foot-interval of the range pole as the 109 tallest leaders

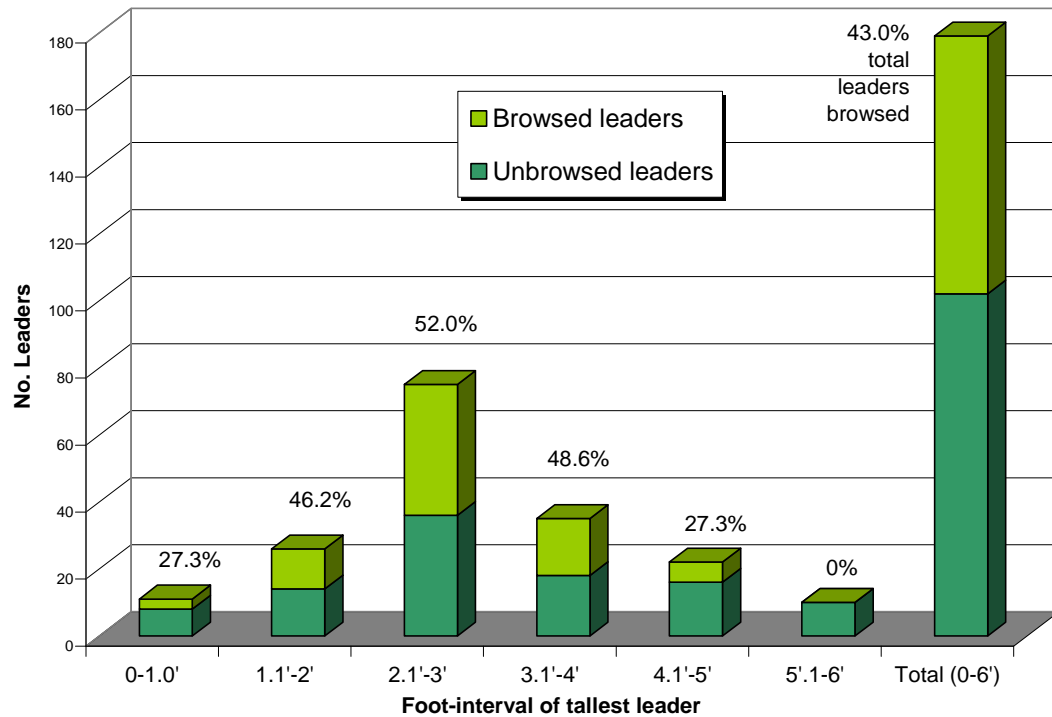
Results

A quick, in-field analysis by hand calculations (followed by calculations using data entered into Excel sheets) showed:

- Overall, 43% (77 of 179) all leaders had been browsed
- None of the ten leaders 5.1'-6' tall had been browsed.
- 46.8% of all leaders 1.1'-5' tall had been browsed.

Figure 1 shows the number and percent of leaders browsed by foot-interval and overall (0'-6').

**Fig. 1. Rapid Assessment of Aspen Browse:
Tasha Creek Trial**



The foot-interval experiencing the highest rate of browse was 2.1-3' with 52.0% leaders browsed. The symmetry of percent browse in the two foot-intervals below and above this foot interval (see Fig. 1) is notable:

- 1.1'-2' with 46.2% browse; and 3.1'-4' with 48.6% browsed leaders.
- 0-1.0' and 4.1'-5' each with 27.3% browsed leaders.

An unbrowsed aspen or cottonwood will generally have one leader sprinting upward. When a leader is browsed or otherwise killed, lateral branches turn upward to serve as potential leaders. The 109 plants averaged 1.7 leaders falling within the foot-interval of the tallest leader. By foot interval, the number of leaders falling within the foot-interval of the tallest leader varied from 1.2 to 2.0 (Table 1):

Table 1: Average # leaders per plant	
Foot-interval	Average # leaders w/in foot-interval of tallest leader
0'-1.0'	1.2
1.1'-2.0'	2.0
2.1'-3.0'	1.8
3.1'-4.0'	1.5
4.1'-5.0'	1.7
5.1'-6.0'	1.4

This particular stand of aspen was being grazed by both cattle and elk. The cattle had been in this allotment for approximately two months (July 9 – Sept. 6) and were to leave the allotment in another 6 weeks, on Oct 16.

Attachment A: Sample Data Sheet

Site _____						Researchers _____					
GPS location _____						Date _____					
GPS system (e.g., CONUS NAD27, WGS84) _____											
Quadrangle Map _____											
Township/Section _____											

Plant	0-1'		1.1-2'		2.1-3'		3.1-4'		4.1-5'		5.1-6'		>6'	Notes
	B	Un-B	B	Un-B	B	Un-B	B	Un-B	B	Un-B	B	Un-B		
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Notes: